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AGRICULTURE IN THE PUBLIC SCHOOLS

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Agriculture is a broad and complex subject. It is both a science and an art. As a science it is a study of the soil, its composition, fertility, care, and uses; the vegetation growing therefrom and the animals subsisting thereon. As an art it is the application of scientific principles and knowledge in actual production from the soil, through the culture and development of vegetable and animal life. In general, then, agriculture may be defined as the theory and practice of producing and utilizing plants and animals useful to man, the soil and its management being the basis of the work.

It is not necessary in this place to deal with the history of the subject or the steps by which it has come to be recognized as one of the most important fields of knowledge. Agriculture, like medicine and the law, is a science; and like them, having a sound foundation, it is being developed rapidly along lines which will make it most useful to mankind.

There may be those who think it not practicable to teach agriculture in the public schools because of its range and complexity. We would call the attention of such to the fact that mathematics also is a broad subject and no one claims that all mathematics should be taught in the public schools; but the subject in its simpler phases is nevertheless a proper one to be presented in these schools. In the same way it is not possible to teach all the science or the art of agriculture in the public schools, but since it touches life in a way even more important than mathematics does, it becomes a proper subject for the public-school curriculum.

From the science of psychology we learn that the mental faculties of an individual are active at all stages of his life, but that certain mental faculties are more active at certain periods than at others. We may make three general divisions of these periods of activity. The presentative or the perceptive faculties are most active in childhood, the representative faculties most active in youth, and the reasoning power reaches its highest activity during the maturer years.

A course of study in any subject should be so arranged as to harmonize with the natural activity of the mind at different stages; that is to say, the order of the phases presented must be so arranged as to exercise the presentative, the representative, and the reasoning faculties at the proper time and to the proper degree.

In accordance with this principle, the subject of agriculture may be separated into three divisions, which we may term the elementary, the secondary, and the college courses, corresponding almost exactly to the periods of mental activity named above.

ELEMENTARY COURSE

This course covers the period below high school and is concerned almost entirely with the actual doing of things. The subjects to be presented in this course may include a study of the germination of seeds, the selection and care of seed, the actual planting and producing of flowers and vegetables; also, the observation of soils. The child may be led to know the different kinds of soils, and the effects of cultivation, moisture, and air upon the soil. In addition to this, the care and use of tools needed will be a proper subject of study. The observation of birds, insects, animals, and especially the raising of poultry may also properly be included in this elementary course. The foregoing work will constitute an introduction to the study of crops in general, horticulture, and animal industry; and while the work will consist chiefly in having the child actually do these things, work will consist chiefly in having actually do these things, every step taken must rest upon a scientific basis. In all this work the perceptive faculties will be used most.

SECONDARY OR HIGH-SCHOOL COURSE

This course will mainly treat of agriculture as an art, but of necessity will include certain sections of scientific work. High-school students pursue the subjects of physics, botany, zoölogy, and chemistry, sciences which are all related directly to agri- include laboratory studies and experiments in the fundamental operations of the farm, including work belonging to the subjects of horticulture, botany, soils, crops, and animals. The subjects culture, and in the presentation of each of them, this relation should be made clear. The high-school course may properly of entomology and ornithology as a part of zoölogy closely touch agricultural operations, and these subjects, therefore, may be given some special attention in the high school.

The thought and reasoning powers are more developed in this period, and the high-school course may include a study of the feeding, care, and breeding of animals. The elements of economics as presented in commercial geography, describing the packing, transportation, and marketing of farm products, will lead the high-school student further into the real atmosphere of practical thought and reason.

If we consider the subjects taught in the high school purely from the educational standpoint, supposing that the sole purpose is to train the intellectual faculties and furnish general culture, no one subject is better adapted to this purpose than the subject of agriculture; and we may safely say that any subject which deals with the problems of real human life and at the same time produces acuteness of perception, clearness of memory, and soundness of reason is unquestionably a proper one to be included in the high-school course.

Elementary Agriculture

The following outline of work is specified for the advanced grades, that is, from the fifth to the ninth. No attempt has been made to divide this work according to terms or grades, but a natural order of presentation is given. Graduates from county normal training schools, and others who have had some instruction in agriculture willl be competent to arrange the lessons and present them in an interesting and attractive way. The study of seeds and the manner of planting them can be illustrated in the schoolroom. The various kinds of soil to be found in the neighborhood may be collected and stored in boxes for examination. Small boxes or pails may be used for the planting work in horiculture and wherever possible it is advisable to have a small garden wherein the common vegetables may be planted in the spring. In the fall a flower garden may be prepared and bulbs secured and planted for flowering in the spring.

Through the lessons in the schoolroom the children may be taught to give special attention to their home garden, to flowers, to the care and uses of animals, and may practice also learning the various trees and shrubs on the way to school. A recitation period of one hour per week may be set apart for this work in agriculture; say the last hour on Friday afternoon or the first hour in the morning of some other day. This time will give sufficient opportunity during the school year for the presentation of all the subjects indicated in the outline.

It is to be understood here, as well as in the course in nature-study, that many valuable lessons may be presented and taught outside of school hours.

The chief purpose of this work is not mere instruction. Agriculture is the art of producing from the soil, and in all elementary work we must appeal principally to the motor activity of the child. The child will here learn to do by doing, and he will also learn to love and respect the subject of agriculture as one of the great vocations of mankind.

In working out this outline the teacher may use any of the textbooks now available on the subject of elementary agriculture. The teacher, not the student, should have these books.

OUTLINE

Agronomy......	Crops...........	Structure of farm seeds and grains Seed testing Manner in which young plants appear from seed grain Manner in which young plants appear above ground Kinds, uses Time of planting, period of growth, and means of harvesting
	Soils............	Kinds, structure, and composition. Study of moisture, temperature, and air of the soil Common means of making soils productive

- Horticulture ....
  - Germination of seeds
  - Propagation of plants........
    - Seeds
    - Layers
    - Runners
    - Budding
    - Grafting
  - Garden vegetables and plants....................
    - Planting
    - Culture
    - Harvesting
    - Uses
  - Laboratory methods and work
    - Materials needed. ......
      - sharp knives
      - boxes of earth
      - raffia
      - wax
    - Common sprays for fruit trees and plants
  - Flowers....................
    - Seeds
    - Bulbs
    - Slips or cuttings ..
      - Manner and form of planting
      - Proper effects
      - Window gardens
- Forestry........ Common trees and shrubs of the locality
- Botany.........
  - Common weeds—a few from the locality
  - Structure, flowers, seeds, distribution, destruction
- Entomology—a few insects..
  - Recognition
  - Harm done
  - Means of destruction
- Ornithology—birds ....
  - Recognition
  - Song
  - Habits
  - Nests
  - Usefulness
- Animal husbandry.. Animals, kinds, uses, care
- Mechanics .... Tools, care and use

HIGH-SCHOOL COURSE IN AGRICULTURE

9th Grade	10th Grade	11th Grade	12th Grade
Botany ½ year Agricultural botany ½ year	Horticulture ½ year Crops ½ year	Livestock and poultry ½ year Dairying and farm mechanics ½ year	Soils ½ year Farm management ½ year

OUTLINE OF HIGH-SCHOOL COURSE

- Sciences related to agriculture........
  - Physics
  - Chemistry
  - Botany
  - Zoölogy ....
    - Entomology
    - Ornithology
    - Physiology
- Botany ....
  - General plant-study...........
    - Composition
    - Structure
    - Physiology
  - Agricultural plants
- Horticulture, laboratory practice, and field..............................
  - Culture and breeding
  - Vegetable gardening
  - Flower gardening
  - Orchard
  - Protection, spraying, etc.
  - Marketing
  - Landscape ....
    - Drawings
    - Sketches
- Agronomy.......
  - Soils...........
    - Elements
    - Kinds
    - Fertility
    - Management
    - Ventilation
    - Moisture
    - Temperature
  - Crops...........
    - Seeds..........................
      - Selection
      - Care, treating for diseases
      - Testing
    - Planting
    - Culture.......................
      - Soil needs
      - Climatic needs
      - Improvement
    - Rotation
    - Adaptation
    - Marketing

- Animal husbandry or live stock
  - Breeds
    - Cattle
    - Horses
    - Sheep
    - Swine
  - Uses
  - Care
  - Feeding
  - Judging
  - Marketing
- Poultry
  - Breeds and breeding
  - Incubators
  - Care and feed
  - Marketing
- Dairying
  - Care of milk
  - Tests, Babcock, etc.
  - Testing individual cows
  - Separators
  - Butter making
  - Cheese
- Farm mechanics
  - Tools
    - Kind
    - Care
    - Purchase
  - Repairs
    - Tools
    - Harness
    - Fences
    - Buildings
  - Architecture
    - House
    - Barns
    - Out-buildings and silos
  - Study and comparison of team draft, use of dynamometer
- Farm management
  - Arrangement of field, pastures, rotation
  - Cost of crop production
  - Most profitable crops
  - Most profitable stock
  - Housing of machinery
  - Study of farm buildings in vicinity
  - Drainage, tile, ditches, etc.
  - Sanitation
  - Accounts
  - Crop values, by current prices
  - Average yields in this state compared with the best known
  - Uses of soil